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Dr. Musgrave's Gas Cooking Stoves.

The great importance of utilizing gas for heating and cooking purposes is apparent to every one who makes economy, convenience and cleanliness a study, a duty, or a virtue. Aside from the disagreeabilities and annoyance of using solid fuel in the way of dust, dirt, and smoke, and the necessity of transporting the coal or wood from the yard to the coal cellar, thence to the various apartments where it is used, and conveying the ashes and debris away again; there is the unsatisfactory conciousness of the great loss of latent heat that eccurs, owing to the imperfect combustion of solid fuel, even in our best constructed ranges, furnaces, or stoves. This amounts to not less than 75 per cent., and frequently much more.

In the consumption of gas when properly done, nearly the entire equivalent of heat is obtained. There is no residue left after combustion; there is no dust, dirt, or smoke; but, by simply turning a gas-cock, heat is generated instantaneously, to warm the room, or to perform all the culinary operations required. In this connection we present herewith engravings of Dr. Musgrave's Gas Cooking Stoves, which are so arranged as to be placed on a table or shelf or sideboard, and connected to the gas pipe by a flexible tube or otherwise, in order to bake, boil, fry, stew, or roast, etc.

FIG. 1.
GAS STOVE WITH GAS BRACKET.

FIG. 2.
BURNER STAND WITH GAS BRACKET.

Fig. 1 represents the stove as baking, with gas-bracket, which is movable up and down by the slide-bracket at the right. The gas enters at the bottom of the apparatus and issues in fine lateral jets into an inverted cone, more fully shown in Fig. 2. This cone is capped with a fine gauze disk or cover, through which the gas issues in finely divided jets, where it burns with a blue expanse of flame, showing a large area of perfect combustion.

The article to be baked or roasted is put in a proper vessel which will sit in the stove (Fig. 2), resting upon the trident over the gauze, and just above the flame. The cover is used when baking or roasting, which confines the heat so as to act on both top, bottom and sides. To stew, fry, broil, boil, etc., other vessels are used, and the cover is left off, so as to see to the operation.

Fig. 3 is a small gas stove or burner, for druggists, printers, tailors, bookbinders, saloons—for heating smoothing irons, etc. It can be attached to any gas burner by the flexible tube, and will do all kinds of cooking, except baking and roasting. Two or more of these instruments can be coupled together by a connecting pipe to increase their capacity.

The economy and convenience of this apparatus is apparent. The inventor asserts that a family of four or five persons can employ this stove at a cost less than wood or coal in Cincinnati, where either are cheaper than here. When the fire is not needed it can be instantly extinguished, which is not the case with fires of solid fuel. The labor saved is equal to the cost of gas. The time used in cooking is much shortened, as there are no fires to build and time for heating up required.

The inventor desires to have an agency established in this city. For particulars enquire at this office, where a set of the apparatus can be seen.

Dr. Mugrave's office is No. 158 West Fourth street, Cincinnati, Ohio.

FIG. 3.
SMALL GAS STOVE OR BURNER STAND.

Absorption of Gases by Metals.

Professor Odling, in a lecture on this subject, stated that platinum in the form of wire or plate, at a low red heat, can take up and hold hydrogen gas; but palladium possesses this power in a very high degree and at a lower temperature, neither having the slightest absorbent power for oxygen or nitrogen. This power has been found to vary with the condition of the surface of the metals and the temperature. The pressure required to condense the quantity of gas extracted from these metals in some cases was calculated as equal to 15,000 atmospheres. Some of the hydrogen was extracted by means of Sprengel's air-pump, and proved to possess its ordinary chemical characters. Copper and gold when heated also absorb and retain hydrogen; but silver especially selects oxygen. Iron at a red heat can absorb both hydrogen and carbonic oxide, which facts were shown to have an important bearing on the conversion of iron into steel.

In relation to this subject, Professor Odling actually extracted hydrogen from a piece of the Lenarto meteoric iron, in the presence of his audience. After referring to the analysis of this iron as 85.68 hydrogen, 4.46 carbonic oxide, and 9.86 nitrogen, and to that or ordinary iron as 58 carbonic oxids, 21 hydrogen, and 11 nitrogen, he added that, as hydrogen has been recognised in the spectrum analysis of the light of the fixed stars by Huggins and Miller, and in a numerous class of which Alpha Lyræ is the type, the iron of Lenarto had, no doubt, come from an atmosphere in which hydrogen gas greatly prevailed. We may, therefore, said he, look upon this meteorite as holding imprisoned within it and bearing to us the hydrogen of the stars. It has been found difficult to impregnate malleable iron with more than half its volume of hydrogen gas under the pressure of our atmosphere. Now, the meteoric iron gives off, without being fully exhausted, about six times that amount. The inference, therefore, is that the meteor has been extruded from a dense atmosphere of hydrogen, for which we must look beyond the light cometary matter floating within the limits of the solar system. In regard to the nature of the phenomena connected with the absorption and occlusion of gases by metals, Prof. Odling referred to and illustrated the general proposition of Faraday, in 1823, that a gas is nothing else than the vapor of a volatile liquid at a temperature considerably above the boiling point of the liquid; and after showing by experiments the absorbent powers of colloid substances (such as white of egg) for gases, he expressed his opinion that metals also possess a certain degree of porosity, and thus resemble colloid substances, being more accessible to liquids than gases, which latter undergo the process of liquefaction previous to absorption. Hence a peculiar dialytic action also resides in metallic septa. Professor Odling concluded with remarks on the importance and extensive influence of these researches both on the abstract sciences and on the arts of life.—*London Mining Journal, June.*

—A very simple hygrometer is a few grains of quicklime laid on a plate. If it does not absorb more than one-fortieth of its own weight of water in twenty-four hours, as determined by accurate weighing, the room, says Dr. Coffee, may be fit to live in. In a damp newly-built room, it will increase as much as five per cent.

The Water Supply of Our Great Cities.

BY REV. JOHN W. MEARS.

[Published by order of the Water Committee of the Councils of Philadelphia.]

Returning now to London and modern times, we see this great city, with nearly three and a half million of inhabitants, embarrassed not only in the quantity, but in the quality, of her water supply. With five times the population of Philadelphia, she has, in the river Thames, "the great river" of England, a supply flowing over Tedington Weir, of just about half the volume discharged over Fairmount dam from the smallest of our two great rivers—the Schuylkill. She would literally threaten to drink up that "great river," were she not, in connection with fifty-six other towns upon its banks, fast rendering it utterly unfit to be drunk. The degree of mineral impurity in 1854, was represented by figures as 15.59 degrees. It ranged in 1863-65, from twenty-two to sixteen degrees, there being an improvement latterly; arising, we suppose, from a change in the sources of supply of some of the companies. The organic impurity, although increasingly perceptible to the senses, is not represented in the analysis. The mineral impurity of the Schuylkill at Fairmount is put at six degrees; and our Chief Engineer is every year reminding the authorities in his reports, of the rapid increase of the sources of impurity to this river from the sewage of towns, and the filth of numerous factories of every kind, constantly multiplying on its banks.

As "the great river" of England is becoming hopelessly foul, and as artesian wells are totally inadequate to the wants of the city; as it is idle to look to surface drainage, or to streams in any of the densely populated regions around the city; as even the Severn river, in its lower course, is almost as bad as the Thames, the question forces itself upon the authorities and property owners of the great metropolis how this vital necessity is to be met? Is the growth of London to be arrested and its population finally scattered; and shall those melancholy anticipations of the essayist, with his famous New Zealander, musing on the broken arches of London Bridge, already begin to cast the shadows of a cold reality upon the hearts of her surging and swelling millions? We seem to have found the limit of England's coal supply. About the time she has burned up all the coal she can come at, will her city populations have swallowed, or hopelessly corrupted, all the drinkable water within their reach?

English engineers are answering the question very hopefully for London and other great cities on the island. Far away among the remote and desolate hills of Northern Wales, where the damp winds from the Atlantic impinge upon the rocky walls, and first deliver their heaven-distilled treasures for the use of the inhabitants of earth, 171 miles from the half-famishing, half-poisoned millions of London, wise and skilful men have fixed the probable future location of the pure supplies which are to send health, comfort and cleanliness through the streets of the metropolis. Here, the limpid streams which form part of the head waters of the Severn, are depended on to furnish two hundred million gallons per day, or fifty gallons to each of the present inhabitants, with the chance of increasing the supply as it may be needed. The total cost of these great works, with the long range of aqueducts, is put at £8,600,000—not an enormous sum, when the vast nature and utility of the enterprise is considered. A gala day, indeed, would it prove for London when such a gift was put in her keeping; an omen of better days and of true advance to the corrupt, festering masses of her poorer population. Two millions of dollars worth of soap alone would be saved each year, by substituting the soft water of the hills for the hard water of the Thames River, in washing the clothes of the Londoner.

A truly grand and comprehensive scheme is at the same time broached by these English engineers, which proposes to supply Liverpool, Leeds, and a score of Northern towns, from one and the same undertaking. Copying, doubtless, the very successful experiment by which the pure waters of Loch Katrine are brought in profusion into Glasgow, these engineers propose to apply the pure and abundant waters of two lakes in Cumberland and Westmoreland to a similar source. The mountainous ranges of these counties face seaward, and the regions showed in the year 1845-53, the extraordinary averrge rain fall of 140 inches per annum; *four* times the average in this vicinity. Over the area drained by these lakes, there should, therefore, be an averrge daily drainage, allowing for evaporation, of 550 millions of gallons. From this immense store, in positions elevated from 400 to 700 feet above tide, it would be a simple problem to furnish those low-lying towns with a daily supply of 131 million gallons in the aggregate. The cost of the combined works would be £12,000,000 sterling, the annual revenue being estimated to exceed interest and expenses of every kind.

A NEW SUPPLY FOR PHILADELPHIA—WHY WE MUST LEAVE THE SCHUYLKILL AND DELAWARE RIVERS.

The increasing impurity of the chief water supply of Philadelphia—the Schuylkill—and the rapidity with which our rapidly increasing population has been approaching the extreme limits of the capacity of the existing arrangements for a supply, have furnished frequent topics of warning and argument on the part of Chief Engineer. His latest report warns us that the limits of the pumping machinery, theoretically, are passed, and that practically, we are in a precarious situation, depending upon the power of the machinery to withstand the strain of the excessive duty required of it, and upon exemption from such accidents as a break in the dam, &c. The theoretical limits of the machinery are 36 million gallons daily. In the hot spell of July last, as many as 40 million gallons were forced from the groaning pumps in a day. Our storage capacity is sufficient for but a *two days' supply*. Should we desire to increase our supply from the Schuylkill it will not be practicable to give any great extension to the present cheap but wasteful method of driving the pumping machinery, now practised at Fairmount. Hence a radical change of the mode, as well as a great and permanent increase in the supply, must be provided for.

One would think that Philadelphia, lovingly begirt by two great rivers, of comparatively pure and soft water, rolling for miles by the foot of her wharves, need never be agitated by the question of a water supply. Here it is, in abundance, we imagine we hear thoughtless persons exclaim; what have we to do but to pump it up and drink it? The idea of going miles away from two such streams as the Delaware and Schuylkill, for a water supply for Philadelphia, seems to many a mere freak of engineering folly and ambition, not to say a scorning of the bounties of Providence.

Yet long ago, Rome abandoned the Tiber, and had recourse to its obscure tributary, the Anio: London is about giving up the Thames and going to the rivulets of Northern Wales; Glasgow has abandoned the river Clyde, and has tapped the Loch Katrine; Paris too, is leaving the Seine; Dublin is leaving the Liffey and the Dodder, and Manchester the Mersey. And the Chief Engineer of our water works proposes to leave both the Schuylkill and Delaware behind, and to gather the supplies which are to suffice when Philadelphia requires six times her present demands, from a comparatively small and obscure stream, thirty miles away.

At least he is not suggesting innovations or trifling with established facts, in this serious matter of a water supply for a great American city, in generations to come. He is, in fact, conforming to a widely gathered experience, reaching as far back as 273 B. C., two thousand one hundred and thirty-nine years ago, when the Romans forsook the Tiber, flowing past their doors and betook themselves for a supply to the Anio—a stream which bears much the same relation to the Tiber as the Perkiomen does to our own Schuylkill. He is but applying, with wise foresight, to our own prospective necessities, those valuable lessons which a dire experience has just now forced upon the engineers of the Old World.

Take the case of Glasgow for instance. Here is a city with a broad, deep, navigable stream of fresh water flowing like the Thames and Schuylkill, through its centre. Pumping water works delivered the waters of the Clyde, for many years to the inhabitants. But the supply soon became inadequate; impurities accumulated; freshets filled the water with clay and moss; it was hard and unfit for washing; a multitude of plans were suggested for relieving the difficulty, one of which was carried into effect, and the southern half of the city was well supplied from the head waters of a small stream five miles distant. At length the pure, soft and unfailing waters of Loch Katrine, thirty-five miles to the north of the city, were fixed upon by competent engineers as the proper permanent source of supply. The works were commenced in the spring of 1856. To give an idea of the extraordinary difficulties surmounted in accomplishing the work, we quote from the language of Mr. Bateman, the Chief Engineer:*

"It is impossible to convey to those who have not personally inspected it, an impression of the wild and beautiful district through which the aqueduct passes, for the first ten or twelve miles after leaving Loch Katrine. The country consists of successive ridges of the most obdurate rock, separated by deep, wild valleys in which it was very difficult, in the first instance, to find a way. There were no roads, no houses, no building materials—nothing which would ordinarily be considered essential to the successful completion of a great engineering work for the conveyance of water. The rock, when quarried, was unfit for building purposes; there was no stone of a suitable description to be had, at any reasonable cost or distance; no lime for mortar, no clay for puddle, and no roads to convey material."

* In "Papers read before the Institution of Engineers of Scotland, on the Glasgow Water Works." p. 36.

Such an accumulation of grave difficulties must have led to the utter abandonment of the scheme, if interests less pressing than the supply of hundreds of thousands human beings with water had been concerned, or if a mind of less capacity or genius for engineering than Mr. Bateman's had been charged with the problem. The result was, that the aqueduct assumed the form of an almost continuous tunnel. The rock proved extremely hard and difficult to work. At several points the progress did not exceed *three lineal yards in a month*, in each face of the opening, although the work was carried on day and night. The average progress through the mica slate was about five yards a month. In drilling the holes for blasting, a fresh drill was required for every inch in depth.

In March, 1860, the water was generally distributed through the city. Thus, in the face of doubts and distrust freely expressed, and of unparalleled difficulties, the whole works, involving an outlay of upwards of £900,000, and extending over thirty-four miles of country, were completed in less than four years. It is a work which will bear comparison with the most extensive aqueducts in the world, not excluding those of ancient Rome. Such difficulties were judged necessary to be overcome, in order to supply a city lying on a navigable, fresh-water stream, with water.

(To be continued.)

Progress of Science.

Under the above caption we published, in Nos. 23 and 24 of the last volume of this Journal, an interesting article on the use of petroleum as fuel for steam engines, in which it was stated that experiments were about to be made on board the "Palos." The following, taken from the New York *Sun*, June 13, gives the successful working of such experiments:

"BOSTON, June 14th.—A very important invention for substituting crude petroleum in the place of coal in steam navigation, was tested on the government steamer Palos to-day. Chief Engineer Henderson, of the Charlestown Navy Yard, and Chief Engineer Kellogg, were present as Government Commissioners to investigate and report on the experiments; also Chief Engineer Stimers, Colonel H. R. Foote, of Tennessee, the inventor, and his partners in the enterprise, Messrs. J. B. Winsor, of Pennsylvania, and S. B. Allen, of Boston. Several well known merchants and scientific gentlemen were also on board. Steam was got up in 25 minutes, and the Palos proceeded down the harbor, around the Great Brewsters, and back to the Navy Yard, a distance of 25 nautical miles, in one hour and fifty five minutes. In making the trip she consumed but four barrels of oil.

The Palos was built for the Government as an eight knot boat, and with coal could never be made to exceed that speed. The fires are kindled and extinguished with nearly the same ease as lighting and extinguishing gas burners. A pipe from petroleum tanks on deck supplies the furnace burners. The burners, by their own heat, turn the petroleum in the pipes into gas, there being an arrangement for infusing air and steam and this gas supplies the burners. The flames produced in the furnace are intensely hot. The Government Engineers expressed their surprise at the results obtained, which can hardly fail when the new apparatus it fully perfected, creating a great revolution in river and ocean steam navigation, Much greater speed and economy of labor, fuel and space, with equal safety, are among the benefits anticipated from Colonel Foote's invention. The trial to-day was initiatory, to be followed by seven other trial trips to be made under the sanction of the government."

A dispatch to the *Sun* states that on descending to the fireroom, two men were found doing the work of eight, and, to the surprise of old firemen, the floor was carpeted, and in the place of ashes and dust there was general cleanliness and ventilation.

Diamonds.

At a recent meeting of the California Academy of Natural Science, Prof. Whitney remarked that there are fifteen localities in California at which diamonds have been found in the course of washings for gold. In reply to a question if there was not some familiar test by which miners might prove them, he answered that the easiest way was to try their hardness on other gems, but miners have not always these convenient to do so. A knowledge of the crystalline form, twenty-four sided and the faces curved was the surest test. He said that the popular notion that a diamond could be hammered on an anvil without breaking was a mistake, resulting from confounding hardness and toughness. He remarked, further, that it would not pay in California to wash the gravel beds solely for diamonds. Diamond washings do not pay in any country, except with slave or convict labor.—*Alpine Miner.*

On the Analysis of Coal Gas.

[From "Clegg on the Manufacture of Coal Gas."]

The accurate analysis of gaseous mixtures is one of the most delicate operations of modern chemistry. This arises not only from the difficulty of preserving gases during the requisite manipulations free from admixture with atmospheric air, but also from the circumstance that their volume, the measurement of which is in most cases our only means of estimating their quantity, is liable to constant and considerable change by fluctuations of temperature and of the pressure of the atmosphere, as well as by the dryness or moisture of the gas itself This branch of chemical analysis owes much of its present accuracy and perfection to the researches of Professor Bunsen.

All analytical operations upon gases must be conducted over mercury, which metal should be placed in a small wooden pneumatic trough with plate-glass sides. The eudiometers, or measuring tubes, should be accurately calibrated and graduated into cubic inches and tenths of a cubic inch, the tenths being subdivided by the eye into hundredths when the volume of a gas is read off; this latter division is readily attained by a little practice. At each determination of volume it is necessary that the gas should either be perfectly dry or saturated with moisture. The first condition is attained by placing in the gas for half an hour a small ball of fused chloride of calcium attached to a platinum wire;* the second condition, by introducing a minute drop of water into the head of the eudiometer, before filling it with quicksilver. The determinations of volume must either be made when the mercury is at the level inside and outside the eudiometer, or, as is more frequently done, the difference of level must be accurately measured in the subsequent reduction to a standard pressure. The height of the barometer and the temperature of the surrounding atmosphere must also be observed each time the volume of gas is measured, and proper corrections made for pressure, temperature, and also for the tension of aqueous vapor if the gas be moist. As tables and rules for these corrections are given in most treatises on chemistry, they need not be repeated here.

The process of gas analysis described below has reference to purified coal gas, the method of detecting the several impurities having been already given in the description of the compounds constituting such impurities.

I. ESTIMATION OF CARBONIC ACID.

A few cubic inches of the gas are introduced into a short eudiometer, moistoned as above described; the volume is accurately noted, with the proper corrections, and a bullet of caustic potash is then passed up through the mercury into the gas; it is allowed to remain for at least one hour; the volume of the gas, being again ascertained and subtracted from the first volume, gives the amount of carbonic acid which has been absorbed by the potash.

II. ESTIMATION OF OXYGEN.

This gas can be very accurately estimated by Liebig's method, which depends upon the rapid absorption of oxygen by an alkaline solution of pyrogallic acid. To apply this solution, a small test-tube is filled with quicksilver, and inverted in the mercury trough; a few drops of a saturated solution of pyrogallic acid in water are thrown up into this tube by means of a pipette, and then a similar quantity of a strong solution of potash; a coke bullet attached to a platinum wire is introduced into this liquid, and allowed to saturate itself; it is then withdrawn, and conveyed carefully below the surface of the mercury into the eudiometer containing the residual gas of experiment No. 1. Every trace of oxygen will be absorbed in a few minutes, and the volume being again measured, the diminution from the last reading will represent the amount of oxygen originally present in the gas. It is essential that the coke bullet, after saturation with the alkaline solution of pyrogallic acid, should not come in contact with the air before its introduction into the gas.

III. ESTIMATION OF THE LUMINIFEROUS CONSTITUENTS.

Various methods have been employed for the estimation of the so-called olefiant gas (luminiferous constituents) contained in coal-gas. The one which has been most generally employed depends upon the property which is possessed by olefiant gas and most hydrocarbons, of combining with chlorine, and condensing to an oily liquid. Hydrogen and light carburetted hydrogen are both acted upon in a similar manner when a ray even of light is allowed to have access to the mixture; but the condensation of the olefiant gas and hydrocarbons takes place in perfect darkness, and advantage is therefore taken of this circumstance to observe the amount of condensation which follows when the mixture is excluded from light; the volume which disappears during this action of the chlorine is regarded as indicating the quantity of olefiant gas present in the mixture. There are many sources of error inseparably connected with this method of operating, which render the results unworthy of the slightest confidence; the same remark applies also to the employment of bromine in the place of chlorine. In addition to the circumstance that these determinations must be made over water, which allows a constant diffusion of atmospheric air into the gas, *vice versa*, there is also formed in each case a volatile liquid, the tension of the vapor of which increases the volume of the residual gas, and this increase admits of neither calculation or determination. The only material by which the estimation of the luminiferous constituents can be accurately effected is anhydrous sulphuric acid, which immediately condenses the luminiferous constituents of coal-gas, but has no action upon the other ingredients, even when exposed to sun-light. The estimation is conducted as follows:- A coke bullet, prepared as before described, and attached to a platinum wire, being rendered thoroughly dry by slightly heating it for a few minutes, is quickly immersed in a saturated solution of anhydrous sulphuric acid in Nordhausen sulphuric acid, and allowed to remain in the liquid for one minute; it is then withdrawn, leaving as little superfluous acid adhering to it as possible, and quickly plunged beneath the quicksilver in the trough, and introduced into the same portion of dry gas, from which the carbonic acid and oxygen have been withdrawn by experiments No. I and II. Here it is allowed to remain for about two hours, in order to ensure the complete absorption of every trace of hydrocarbons. The residual volume of gas cannot however yet be determined, owing to the presence of some sulphurous acid derived from the decomposition of a portion of the sulphuric acid. This is absorbed in a few minutes by the introduction of a moist bullet of peroxide of manganese, which is readily made by converting finely powdered peroxide of manganese into a stiff paste with water, rolling it into the shape of a small bullet, and then inserting a bent platinum wire, in such a manner as to prevent its readily being drawn out. The ball should be put in a warm place, and allowed slowly to dry; it will then become hard, and possess considerable cohesion, even after being moistoned with a drop of water previous to its introduction into the gas. After half an hour, the bullet of peroxide of manganese may be withdrawn and replaced by one of caustic potash, to remove the watery vapor introduced with the previous one; at the end of another half-hour this bullet may be removed, and the volume of the gas at once read off. The difference between this and the previous reading gives the volume of the luminiferous constituents contained in the gas. This methed is very accurate; in two analyses of the same gas the percentage of luminiferous constituents seldom varies more than ·01 or ·02 per cent.

IV. ESTIMATION OF THE NON-LUMINOUS CONTITUENTS.

These are light carburetted hydrogen, hydrogen, carbonic oxide, and nitrogen. The percentage of these gases is ascertained in a graduated eudiometer, about two feet in length, and three-fourths of an inch internal diameter, the thickness of the glass being not more than one-tenth of an inch. This eudiometer is furnished, at its closed end, with two platinum wires, fused into the glass, for the transmission of the electric spark. A drop of water, about the size of a pin's head, is introduced into the upper part of the eudiometer, before it is filled with mercury and inverted in the mecurial trough; this small quantity of water serving to saturate with watery vapor the gases subsequaently introduced. About a cubic inch of the residual gas from the last determination is passed into the eudiometer, and its volume accurately read of: about four cubic inches of pure oxygen are now introduced, the volume (moist) again determined. The oxygen is best prepared at the moment it is wanted, by heating, over a spirit or gas flame, a little chlorate of potash in a very small glass retort, allowing of course sufficient time for every trace of atmospheric air to be expelled from the retort before passing the gas into the eudiometer. The open end of the eudiometer must now be pressed firmly upon a thick piece of india-rubber, placed at the bottom of the trough, and an electric spark passed through the mixture. If the above proportions have been observed the explosion will be but slight, which is essential if nitrogen be present in the gas, as this element will otherwise be partially converted into nitric acid, and thus vitiate the results; by using a large excess of oxygen, all danger of the bursting of the eudiometer by the force of the explosion is also avoided. The volume after explosion being again determined, a bullet of caustic potash is introduced into the gas, and allowed to remain so long as any diminution of volume takes place. This bullet absorbs the carbonic acid which has been produced by the combustion of the light carburetted hydrogen and carbonic oxide, and also renders the residual gas perfectly dry. The volume read off after this absorption, when deducted from the previous reading, gives the volume of carbonic acid generated by the combustion of the gas.

The residual gas now contains only nitrogen and the excess of oxygen employed. The former is determined by first ascertaining the amount of oxygen present, and then deducting that number from the volume of both gases. For this purpose a quantity of dry hydrogen, at least three times as great as the residual gas, is introduced, and the volume of the mixture determined; the explosion is then made as before, and the volume (moist) again recorded. One-third of the contraction caused by this explosion represents the volume of oxygen, and this deducted from the volume of residual gas, after absorption of carbonic acid, gives the amount of nitrogen.

The behaviour of the other three non-luminous gases on explosion with oxygen enables us readily to find their respective amounts by three simple equations, founded upon the quantity of oxygen consumed, and the amount of carbonic acid generated by the three gases in question. Hydrogen consumes half its own volume of oxygen, and generates no carbonic acid; light carburetted hydrogen consumes twice its own volume of oxygen, and generates own volume of carbonic acid; whilst carbonic oxide consumes half its volume of oxygen, and generates its own volume of carbonic acid If therefore we represent the volume of the mixed gases by A, the amount of oxygen consumed by B, and the quantity of carbonic acid generated by C, and further, the volumes of hydrogen, light carburetted hydrogen, and carbonic oxide by x, y and z, we have the following equations:

$$\begin{aligned} x + y + z &= A \\ \tfrac{1}{2}x + 2y + \tfrac{1}{2}z &= B \\ y + z &= C \end{aligned}$$

from which the following value for x, y, and z are derived:—

$$x = A - C$$

$$y = \frac{2B - A}{3}$$

$$z = C - \left\{\frac{2B - A}{3}\right\}$$

(To be concluded in our next issue.)

* These balls, which should be of the size of a large pea, are required constantly in operations on gases. They are readily prepared when the substance of which they are formed is fusible by heat, as chloride of calcium or caustic potash, by melting these materials in a crucible and then pouring them into a small bullet-mould in which the curved end of a platinum wire has been placed; when quite cold, the ball attached to the wire is readily removed from the mould. Coke-bullets are made by filling the mould containing a platinum wire with a mixture of two parts of coke and one of coal, both finely powdered, and then exposing the mould and its contents to a heat gradually increased to redness, for a quarter of an hour

Brevities.

—Zanesville, Ohio, is to have new water-works.

—The supply of ice gathered for New York is about 600,000 tons, being 55,000 tons over that of last year.

—It is said that the Russian American forests supply the finest timber in the world.

—There are thirty-five glass works in the "Smoky City," with a capital of $6,800,000.

—The contractor of the Chicago lake tunnel are said to have netted $45,000 from its erection.

—Six woolen mills in Oregon worked up more than 1,000,000 pounds of wool during the past year.

—In digging a well at Portland, Me., recently, clam shells were found forty-four feet below the surface.

—The gas works at Sag Harbor have been discontinued for the want of paying patronage.

—There is in England a society for the encouragement of aerial navigation termed the "Aeronautical Society of Great Britain."

—A New York company is preparing to bring from Rockbridge county, Va., 500 barrels per month of white sand, to be used in making glass.

—The divisibility of copper is so great that a grain of it dissolved in an alkali will give a sensible color to 500,000 times its weight in water.

—A quick process for getting drying linseed oil is given by Dr. Dullo: boil the raw oil for two hours with binoxide of manganese and hydro chloric acid.

—The locomotive now runs 450 miles west of St. Louis, and the track is being laid at the rate of a mile every day.

—In England there is manufactured and constantly on sale a portable complete apparatus for the electric light.

—It is reported that a valuable deposit of galena or lead ore has been discovered in Bedford county, Pa., near the town of Woodberry.

—A monster gas receiver is being built by the New Haven Gas Company. It is to hold 250,000 feet of gas. The wall will contain 800,000 bricks. The whole arrangement is to cost $50,000.

A New Thing Under the Sun—Gas Cooking Stove.

[From the Missouri Republican, June 5.]

Solomon declared there was nothing new under the sun—that all was vanity, yea, vanity of vanities. Now, there may have been photographers in those days as skillful as Scholten; customers as apt as Bennett and Shea; there may have been railroad collisions, boiler explosions, and coroners' juries, city charters and radical councils to "bust" them, but Solomon never saw a gas cooking stove, or he wouldn't have cared to pass his name down to posterity as responsible authority for that declaration. *We* declare that there *is* something new under the sun, and that it is a gas cooking and heating stove. A gas stove is not only an utilitarian invention, but an aid to morality. It will raise the temperature in our rooms and check profanity; furnish us a delightful atmosphere and ensure the serenity of our spouses. It will save our pockets from depletion: protect us from the rigors of keen winters' blasts; render late dinners obsolete or mere matters of choice; banish ill temper and make the fortunes of the inventors. We may write enthusiastically but none the less truthfully. Perish the man who could not warm up with a gas stove—not only his physical but mental system.

The Cambridge Gas Stove and Boiler Company is not composed of philanthropists but of strong-sensed, practical business men. They propose to do the world a benefit and divide the profits with it. What man does not wish them unlimited success so long as he shares with them? It is composed of some of the best and shrewdest of our business men. Gen. Chester Harding has laid down Blackstone for a moment to investigate the advantages of the invention and finally to assume the presidency. Charles Haskins, Esq., is secretary; George I. Barnett, the well-known architect, Samuel Simmons, Gerard B. Allen, Hull & Cozzens, and other well-known Louisians are stockholders and directors in the company.

If there is a housekeeper, restaurateur, or a hotel proprietor in the city who does not read this article and examine the gas stove, he has not injured the writer or the company, but himself. Let him go on in his ignorance and pay for it with every wood and coal bill. Let him with difficulty make both ends meet; and perish finally without a dollar for his relations to quarrel over. When he is twenty years dust, inexorable fate will erect a gas stove over his lodging place and cook a dinner for forty persons at the cost of one cent.

The gas stove, either for heating or cooking purposes, is very much like any stove, except in the matter of consumption and trouble. The fire can be started as quickly as one would explode a pistol. The room can be heated in less time than the servant can bring up a bucket of coal. A meal may be cooked in 15 minutes, and all at a cost of from one or two to ten cents. We have to lay in no burdensome stock of fuel. It makes no difference to us whether miners strike or work; we are secure from storm or cold or political discontent—from the monopoly of labor organizations or the tyranny of servants. Let us see if we are not. It is a well established principle that twenty square feet surface of metal heated to 200° Fahr., will heat a room to 70° temperature, 16 feet square and 12 feet high, or 3,072 cubic feet of space, and this 20 square feet of metal can be heated by this invention at a cost of less than two cents.

It is a cold morning—the room is at a freezing temperature—you jump out of bed, light a match, turn on the gas, get back again to the warm blankets, and in fifteen minutes your room is heated to 70°. There is no noise, dust or disturbance. You bathe and dress in a delightfully warm atmosphere, turn off your gas and go out to your matutinal meal, all at a cost of one cent. You are a housekeeper with ten in your family, or a boarding-house keeper with forty, or a hotel proprietor with one hundred. It is hot weather and you want no long continued fire, you light the gas and in ten minutes the water is boiling on the range, in one apartment a roast of beef is sputtering, in another a steak is broiling, five or ten loaves of bread are turning to a delightful brown in the baker, or a chicken is frying in another apartment, all done in less than half an hour, the gas turned off, and the expenses stopped. These are a few of the advantages of the gas cooking stove or range.

The invention is a very simple one indeed. The common fish tail burner is used, and over this is placed a metal tube four inches in height, which fits snugly. As the gas escapes from the orifice it is joined by a current of air which carries it to the top of the tube, where combustion takes place. The flame at the mouth of the burner and without the metal tube would be of 700° of heat, but when the tube is connected and the oxygen admitted, where it comes in contact with the surface of the stove, is over 5,000°. It may, therefore, be readily believed that very nearly all the heat of the flame is utilized at a consequent great saving of expense, where heat in this manner is used at the expense of light as in an alcohol lamp. For a forty person-power cooking stove, if we may rate it in that way, eight burners are necessary, provided it is worked to its full capacity. These burners will each consume five feet of gas per hour, which, at the present price, would cost fifteen cents. But there will be portable gas producers shortly introduced when fifteen cents will be reduced to ten or twelve.

The Boston and Cambridge Gas Cooking Stove Company have organized, and will shortly be ready to turn out as many of their heating and cooking stoves as may be demanded. Their cost will not exceed that of ordinary wood and coal patterns, nor will they occupy any more space. They are free from dust, soot or litter—the heat can be regulated with mathematical exactness, besides possessing many other advantages we have no space to mention. The company have an office at No. 309 Pine street, in the Law and Insurance Building, where almost daily the practical operations of the new invention may be witnessed.

Scotch Gas Coals—Rochsoles.

The Rochsoles Gas Coal is a mineral nearly allied to the celebrated Boghead coal, and produces a rich return in gas. As this class of coal is becoming year by year scarce, its value has been enhanced; and it is well known that the output of the best kinds has been contracted for while the seams last. On the other hand, several new pits have been opened, whose produce would have naturally come in to supply the deficiency; but these were conserved for oil distillation, and the overplus of the old works was as anxiously secured for the same purpose. Since that time oil distillation has nearly ceased, and the proprietors of various seams of gas coal are now freely offering their mineral for sale. By an analysis of some Scotch gas coals, Professor Fyfe, of Aberdeen, supplies the following results:

Boghead.....	15,486 cub. ft.	per ton of coal.
Arniston.....	10,500 "	" "
Lesmahagow.. ..	10,176 "	" "

Mr. Young, of Dalkeith gas works, subjected 26 cwt. of the Rochsoles coal to the test, and found that it yielded 11,902 cubic feet of gas to the ton of coal. This proves its superiority to both Arniston and Lesmahagow, and we believe the proprietors are willing to offer it on moderate terms. As the full analysis of this coal may prove satisfactory to our readers, we give it in detail:

CHEMICAL REPORT ON ROCHSOLES GAS COAL.

A commercial sample of Rochsoles gas coal, consisting of 26 cwts., was received here on the 20th ult. for analysis for gas, from Messrs. James Struthers & Co., Rochsoles Colliery, Airdrie. The following deductions were made from working the entire sample, as in the ordinary practice in gas making; 6,000 cubic feet of the gas was stored for examination; 1000 parts of the coal gave the following:

ANALYSIS.

Volatile matter (gas, tar and water)...per cent.	46·05
Fixed combustible matter (fuel).....	20·75
Ash.....	31·02
Sulphur.....	1·28
Water.....	0·90—100·00

COMMERCIAL ANALYSIS.

Gas from 1 ton of coal, corrected to temp. 60°, pressure 30".....	11,902 cubic feet.
Coke from one ton of coal	1,182 lbs.
Ash in the coke.....	58·8 per cent.
Ash in one ton of coal.....	695 lbs.
Sulphur in one ton of coal.....	28·69 lbs.
Specific gravity of the coal.....	1·658 water—1000
Weight of one cubic foot of coal	103·6 lbs.
Gas from one cubic foot of coal.....	550 cubic feet.
Specific gravity of the gas.....	542 air—1000.
Hygrometric water in one ton of coal.....	2·16 gallons.
Hydro-carbon vapors absorbed by bromine...	11·9 per cent.
Durability of one cubic foot of Gas by jet of 5 inch flame	57' 50"
Relative value of 1 cubic foot of gas in sperm	636 grains.
Illuminating power of five cubic feet of gas, deduced from 30 observations by a union jet, consuming 3·952 cubic feet per hour, in standard sperm candles.....	36·5 candles.

GENERAL OBSERVATIONS.

Whether for quantity or quality of gas this coal stands high among first-class Scotch Cannels. The yield of gas is nearly 12,000 cubic feet to the ton, which is only excelled by a very few first-class Cannels. The seam appears to be about 3½ inches thick, and comprises three distinct bands, having each their peculiar physical characteristics. A band of 1½ inch on the one side has the appearance of ebony, and a density of 1·619 as compared with water. The middle band has a yellow color, and a density of 2·112; and the third band has a highly mammalated cleavage, and a density of 1.238. The mechanical water is only 0·9 per cent. This is the dryest coal that has come through my hands. Bulk for bulk this coal yields more gas than Boghead coal; it is, therefore, well adapted for the rapid manufacture of gas. This coal has not a single detractory property but the quality of the coke.

J. YOUNG, F. R. S. S. A.,
Gas Engineer.

Laboratory, Dalkeith Gas Works.

The unlooked for depression in the oil trade is, no doubt, the reason why the proprietors are introducing this coal to the notice of gas companies, and from its high yield per ton, and excellent quality, there is no doubt it will find a ready market.—*London Mining Journal, June.*

Separating Nitric from Sulphuric Acid.

The following remarks on the removal of nitric acid from sulphuric acid by charcoal, written by William Skey, analyst to the Geologcical Survey, New Zealand, were recently published in the *Chemical News:*

"In certain analytical operations, also for voltaic batteries, it is sometimes necessary to use sulphuric acid which is uncontaminated with nitric acid; but their separation has hitherto been a matter of difficulty, only attained by methods of a very protracted nature. In the case of dilute sulphuric acid, however, this can be effected by shaking it up with a little freshly burned charcoal in a state of powder for a few minutes and afterwards fitlering. Sulphuric acid which has passed through this operation does not give any reaction of nitric acid when left in contact with crystalized sulphate of iron, although before the action may have been very decided. But if concentrated sulphuric acid which is only very slightly admixed with nitric acid be taked and agitated with charcoal as before, it will be found, even after a very long contact, that a crystal of sulphate of iron immersed in it is turned of a pink color, just as quickly as if charcoal had not been used. This refusal of charcoal to absorb nitric acid from its solution in concentrated sulphuric acid, would seem to indicate that this acid is retained by the charcoal in the first instance in the form of a hydrate, the dilute condition of the sulphuric acid employed preventing its decomposition."

Electricity Applied to Iron Smelting.

Of all the remarkable applications of electro-magnetism which have been made within the past three or four years, the most remarkable, perhaps, is the one now talked about—the use of an electro-magnetic current in the smelting of iron. We hear that the experiment has been tried at one of the leading ironworks in Sheffield, and with complete success.

The mode of operation, as roughly described, is to place a fixed electro magnet opposite an opening in the side of the furnace, to excite the magnet by means of a Smee's battery, and to direct the current of magnetism into the molten metal. The effect is surprising; the metal appears to bubble and boil, the melting is expedited, which economizes fuel, and the quality of iron is so much improved, that for toughness and hardness it can hardly be equalled. It appears that some, if not all, of the impurities which remain after the ordinary process are driven out by the use of magnetism; consequently, this new application of the occult element may be regarded as full of promise for all who work in iron. As is known to some mechanicians, the late Dr. Siever invented a process by which iron could be converted into puddled or wrought iron before it left the smelting furnace; but the employment of magnetism seems likely to be more effectual. Further particulars will probably be forthcoming in a short time; meanwhile, we would suggest that it is a case for the application of Wilde's electro-magnetic machine. With the powerful currents thereby generated the results of smelting should be still more important.—*South Durham (England) Mercury.*

Correspondence.

The following letter from our valued correspondent, Mr. George Rugan, Superintendent of the Terre Haute Gas Works, will be interesting to our readers as an example of the thrift and enterprise of the numberless new and growing towns and cities, and the wonderful resources of the great West. It will also correct some errors that occurred in the letter from our "special correspondent," in our last number, written after a very hurried visit, and necessarily a somewhat imperfect examination of the gas-works there, which being done in connection with the examination of works elsewhere, may have caused the discrepancy:

TO EDITORS OF THE AM. GAS-LIGHT JOURNAL:

Mr. Editor: Terre Haute is a beautiful and thriving city, on the Wabash River, of about 18,000 inhabitants. The streets are regular and wide, lined with beautiful trees to relieve the residents during the heated term, by their refreshing shade. In that part of the city specially devoted to business, are business houses and stores, which in architectural design, spaciousness and beauty of arrangement, will compare favorably with most of our large cities, while the displays of goods are peculiarly fine and attractive. Many of the private residences equal the finest specimens of suburban elegance in our eastern cities, from which they descend in every gradation of style to the pleasant and comfortable residences of our mechanical and laboring population. Nearly all are built on the centre of grassy lots, 75 feet front, running to 100 feet and over in depth, with gardens filled with trees, shrubbery and vegetables of every variety and kind; a delightful peculiarity being that most of the residences are owned and occupied by the same individual; consequently, each strives to make his home a charming spot—realizing the full meaning of the terms, "that every man's house is his castle—that he is sitting under his own vine, and enjoying the fruits of his own labor," therefore you need scarcely be told, we are a free, intelligent and happy people.

For religious and moral character—for general intelligence and sobriety—for every quality that makes a self-reliant, pushing and energetic people, we have all the pre-requisites; as a consequence churches are numerous—our public schools, which are large and commodious, built on the most approved plans, and constructed after finished architectural designs, are prominent objects of interest and ornaments to the town, and are filled with children eager for instruction.

There is now in the course of erection a State Normal school, which in beauty of design will compare with those buildings already erected at different points in the West; in it our present high school will be located, and the standard of instruction be raised to the highest point of excellence. The city presented a square of ground for its location, and our citizens contributed a loan of $50,000 towards its erection, the balance to be furnished by the State—its estimated cost when completed is $150,000.

Surrounding us on every side are beds of superior bituminous coals, one area 20 miles long and 10 miles wide being "block coal," said to be unsurpassed in the States, for the smelting and manufacture of iron. Forges, rolling mills and nail factories are being located here and at Brazil, twenty miles east, an the Terre Haute and Indiana Railroad, and at no distant day we think this place will be the great center for the manufacture of iron in all its branches—agricultural implements, wagons, etc., etc. There are capitalists here at this time from the East, who are canvassing for the erection of a nail factory on a large scale at this point. Being a railroad center—the Terre Haute and Indiana road to the east—the Evansville and Co. road to the south—the Rockville road to the north, and the St. Louis, A. and Terre Haute road west, which makes us the connecting link between the East and the Pacific—also being the terminus of the Wabash and Erie Canal from Toledo to this place and for our western boundary, having the beautiful Wabash navigable to this point and above for large steamboats, naturally points to this city, as a great center for the upbuilding of manufacturing interests. Here we have abundance of the raw material—wood of every variety—iron, fire clay, coal, etc., which will naturally attract capital and requisite mechanical labor.

Here we have already located, beside the locomotive and machine shops connected with the various railroads, founderies and machine shops—woolen mills, numerous large flouring mills, furniture factories—no less than 15 wagon establishments of various sizes, several extensive cooper shops, some of whom export their labor to New Orleans and intermediate points, etc., while large quantities of agricultural implements, stores, wagons, etc., imported to this point for distribution, to supply the immense trade in these articles at this place. A street railroad is now nearly completed, the cars being expected to arrive from the manufacturers—while in a beautiful grove, a few miles east of the city, our State Fair grounds are being put in splendid condition for the annual display.

We have one steam fire engine and another is ordered from the manufacturers by our City Fathers—as yet we have no water works, but the gas works is a live institution, situated toward the north, only five squares distant from the business part of the town, with a thickly populated outskirt beyond it.

The retort house is a substantial brick building with iron frame roof covered with slate, and contains six benches of three retorts (iron) each, attached to which is the coal shed capable of holding 20,000 bushels of coal. We use "Youghiogheny" coal (Pittsburg) exclusively, for although our western coal yields gas, some of 3.85 100 feet to the lb., yet, as far as our experience has gone, there is nothing equal to *good coal* for producing *cheap* gas; which, as we have observed in our former letters, and which we think will bear repetition, "that the superior quality of the gas produced, the excess per foot per lb. made from it, the saving in purification, the increased length of time the benches will run, the superior quality of the coke manufactured and consequent increase of price therefore; also the less likelihood of loss from spontaneous combustion, etc., beside the economy of labor, afford a combination of advantages which, in our opinion, will yield larger returns for the same amount of capital invested, than using the low-producing, cheap coals.

We have two holders, the smaller with a working capacity of 20,000 feet, and the larger, or new holder, of 56,000 cubic feet, making a working capacity of 75,000 cubic feet, which can be worked up to over 100,000 cubic feet per day (24 hours), as every person conversant with gas works is aware. Our office is large and airy, in the rear of which is the purifying house, lime house, steam engine, etc.

The price of gas is $4 per 1000, including tax, thus netting $3.80 per 1000, with a meter rent of 25 cents per month added. Chauncey Rose, Esq., *is not* building a new hotel, he sunk the artesian well for the purpose of obtaining soft water for the Terre Haute House, which he at that time owned, but subsequently sold to a company of resident gentlemen, who now run it. Mr. Rose is well known among the solid men of New York. Petroleum was reached at something over 1,300 feet, but the well was subsequently deepened to 1,650 feet. We believe it is his intention to go still deeper—soft water being the object aimed at. R.

Manufacture of Illuminating Gas and Oil.

The invention of Mr. G. M'Kenzie, of Glasgow, consists in combining coal with shale oil or other mineral oil, and in subjecting the mixture to distillation or decomposition at various heats. By the term "coal," he denotes the various kinds frequently termed "bituminous coals" but does not include "lignite," "brown coal" nor "anthracite," whilst he remarks it will probably not be found economically advantageous to employ the varieties commonly known as "gas coal" (except, perhaps, mixed with inferior coal) in working his invention.

In practically carrying out his invention for the purpose of obtaining illuminating gas in the manner which he at present believes to yield the best results, but to the precise details of which he by no means restricts himself, he combines the coal and oil in the proportions of thirty gallons of oil to one ton of coal; he prefers to have the coal and oil as free from water as possible, and either to take coal already existing in a pulverized state, or as separated by riddling or sifting, or to reduce the coal to a pulverized state by grinding. He combines the oil and coal by intimately mixing the oil with the pulverized coal in any convenient way, preferring to make the combination with the oil, or both oil and coal, in a heated state. It is not essential, however, that either oil or coal should be heated when being mixed. The mixing may be effected in a mixing or grinding mill, such as is used in grinding mortar or loam. He does not restrict himself to any particular kind of mineral oil, but he prefers to take crude shale oil or petroleum, and if such oil as purchased or as manufactured for the purpose of his invention contains volatile oils or water, he prefers to remove these by distilling them off or otherwise, before combining the oil with the coal. When the oil is heated for such a purpose—that is to say for removing the volatile oil and water—then he at once combines it with the coal without allowing it to cool. In some cases, the residue known as "bottoms," obtained in treating crude shale oil in the existing processes of manufacture, and which is left in the still after distilling off the "light" and "lubricating" oils, may be mixed with the crude oil employed in carrying out the invention, with the view of reducing the aggregate cost of the raw materials. His improved gas compound, prepared in this manner, is treated for the obtainment of illuminating gas, precisely like the ordinary gas coal used for that purpose—that is to say, it is put into the gas retorts of iron or fire-clay, such as are at present in use, and the distillation or decomposition is effected in the ordinary way, it being necessary to remark in connection therewith merely that it is advantageous to employ a strong heat, never less than a bright red heat, but a white heat, or nearly so. A carbonaceous residue or coke is left in the retort, as with ordinary gas coal, and being of good quality will, by its use or sale, reduce the cost of illuminating gas.—*London Mining Journal.*

Chicago Tunnel Accident.

CAVING IN OF THE CONNECTING LINK BETWEEN THE LAKE WATER AND THE PEOPLE.

The Chicagoans are intent upon securing the fullest advantages of their great Lake Tunnel, and as a means to that end they are making a tunnel through Washington street connecting with the Lake tunnel. This work, though small compared with the other, has had more mishaps within a month or two than the Lake tunnel had from its inception to its completion. Another of those mishaps befel it on Friday morning as we learn from the Chicago papers. The *Republican* of June 3d says:

"At three o'clock yesterday morning, the frame work which supported the engine and derrick at the east end of the Washington street tunnel gave way, falling in with a loud crash. About 10 o'clock the night previous, J. Drew, the night watchman of the tunnel, heard a creaking of the timber, and for hours afterward the noise continued, when, after a moment's cessation, everything fell to the bottom of the excavation. Workmen were engaged recently in placing wedges and braces under the frame work, in order to strengthen it, and the work was commenced from the furthest eastern end, with a view to avoid all unnecessary danger. On Thursday night, the men engaged in the work left it without properly securing a wedge or brace, and to this fact the main origin of the accident is traced. It is said that there existed a space of about fifteen feet on the southern portion of the structure which was very imperfectly braced. The engine was taken from the ruins intact. The watchman was yesterday examined by the Board of Public Works. It is very probable that this casualty will prevent a speedy progression of the work upon the tunnel."

The Platinum Gas Light Perfecter.

Mr. John Scholl, of London, has lately brought out a cheap and useful article which he calls a "Gas-light Perfecter," the placing of which over an ordinary fish-tail or other gas burner increases the brilliancy of the light to an extraordinary extent. As adapted for fish-tail and bat's-wing burners, the perfecter consists of a short brass tube or cap, which is split in order to enable it to grip the exterior of the burner when applied, and diametrically across one end of this tube there is secured a thin strip of platinum, placed edgewise. This cap is to be placed upon the burner so that the lower edge of the platinum strip may rest close upon the top of it, and, in the case of a fish-tail burner, exactly between the holes, so that it may be in the middle of the flame lengthwise. In the case of a bat-wing burner the strip should be parallel with, but not immediately over, the slit; and when an argand burner is used, the strip is made of an annular form, and provided with spring clips to fit the inside of the burner. The annular strip of platinum should be so adjusted as to conform to the series of holes, and be situated just sufficiently to one side thereof not to actually impede or obstruct the exit of the gas. From experiments we have made on an ordinary fish-tail burner consuming 2½ feet of gas per hour, and giving the light of 6 candles, we find that the addition of the Perfecter to the same burner increases the light obtained to 9 candles. An important saving in gas is thus obtained, and in addition, the Perfecter causes the whole of the gas to be consumed; hence all unpleasant smell and the whistling from unequal pressure is prevented. We have no hesitation in recommending the "Gas-light Perfecter" to the notice of all gas consumers.—*Practical Mechanics' Journal.*

Mining Share Market.

The San Francisco Weekly Stock Circular of May 25, gives the market rates of mining stock as follows:

The mining share market continues to be characterized by large transactions in the various claims at present on the list of the Board. Most shares have sold at an advance over our quotations of last week, and greater firmness prevails in this class of securities than for some time past.

SAVAGE—has been in the market to a limited ettent at enhanced rate, it is held with great firmness, advancing from $3,500 to $3,700, and at the close $3,750 was bid. The Superintendent's report states that 2,326 tons of ore were extracted during the week ending May 18th, the approximate value of which is given at $96,596, or $41.57 per ton. The ore worked during the previous week yielded $42.22 per ton.

HALE & NORCROSS—has been offered at $3,500 during the past week The average yield of this company's ore up to the 19th inst. has been $42.60 p. ton, with a gradual improvement toward the close. From the 1st to the 19th inst., 2,178 tons of ore were delivered to the mills, 65 per cent. of which, being the amount obtained from the mills, shows a yield of $92,200.

YELLOW JACLET—has been in favor, with small sales at an advance, rising from $1,725 to $1,835, receding to $1,800@1,785, and closing at $1,770. From the 1st to the 18th inst. this company's mine produced 2,712 tons of ore, showing an assay value of $377.00 pr. ton. During the same period the bullion returns amounted to $66,311.36. At the close of April, this company had a cash balance of $100,596 over all liabilities.

CROWN POINT—receded from $1,725 to $1,650, gradually advanced to $1,750, and closed at $1,750.

CHOLLAR POTOSI—has been in considerable favor, improving from $600 to $645, declining to $580, rallying to $613, and closing at $605.

GOULD & CURRY—advanced from $575 to $660, receded to $600, dropped to $525, and at the close selling at $580.

OPHIR—has been exceedingly active, nearly 600 ft. having changed hands during the past week, opening at $387.50, advancing to $425, receding to $350 rallying to $380, falling to $345 under heavy sales, and closing yesterday at $395.

IMPERIAL—is in better favor, gradually improving from $192 to $217.50, then selling at $313 50, and at the close realizing $192.50. The receipts of bullion during the first half of the current month amounted to $25,488. The ore sent to the mills during the same period aggregated 5,412 tons, and a surplus of about 1,000 tons remains at the dump of the Alta mine.

ALPHA—sold at $400@405....BELCHER realized $396@410, closing yesterday at $415... EMPIRE declined from $170 to $165, advanced to $172, and at the close $170 was bid.

CONFIDENCE—declined from $67.50 to $50, assessment of $10 delinquent on 23d instant, and closed at $55 bid.

PATENT CLAIMS.

Pertaining to Gas, Mining, Petroleum, Water etc.

FOR THE TWO WEEKS ENDING JULY 2, 1867.

65,526.—FIRE ALARM.—W. W. Andrews, J. Cummer, J. F. Ganweiler, and Jost Stengel, Croton, Michigan.

1st. I claim the employment of cords B, B, when said cords are saturated with some inflammable material for the purpose of more effectually enabling them to be consumed or severed in case of fire substantially as described.

2d. The employment of rods C C, in the manner specified for the purpose of indicating the exact room or locality in which the fire originated in combination with levers G, and weights F F, substantially as described.

65,536.—STEAM ENGINE.—R. Brayton, S. Curtis, and David June, Fremont, Ohio.

1st. We claim the cam d, yoke c, stem b, and valve a, as arranged in combination with the chamber P', valve I', and pipes O' and R, for the purpose and in the manner as herein described.

2d. The link K, rock shaft J, and link e', as arranged in combination with the cam d, yoke c, stem b, and valve a, for the purpose and in the manner set forth.

65,595.—BLAST APPARATUS FOR CARBURETERS.—F. S. Pease, Buffalo, N. Y.

I claim the arrangement of the shaft A, cams B B, dividing the circle and operating the bellows of correspondtng numbers, which are adjusted as to capacity by the check string c, the whole constructed and operated substantially as described and represented

65,705.—APPARATUS FOR TREATING AIR AND HYDROCARBON VAPOR FOR ILLUMINATING GAS.—Levi Stephens, Fitchburg, Mass.

I claim the apparatus for treating hydrocarbon vapor for illuminating gas, substantially as described and for the purpose specified.

Also I claim the combination of the float k k, with the rod a, and head s, arranged substantially as described and for the purpose set forth.

Also I claim the use of alcohol for improving the quality of the gas for combustion, in combination with the use of lime, substantially as described and for the purpose set forth.

65,714.—EVAPORATOR.—Samuel M. Williams, Pine Village, Indiana.

1st. I claim an improved evaporator formed by the combination of the pans C D and E, with the furnace A, when said furnace is constructed and arranged as hesein described and for the purpose set forth.

2d. The skimmer F, formed by the combination of the perforated or wire-gauze plate f', substantially as described and for the purpose set forth.

65,733.—PROCESS OF MANUFACTURING ILLUMINATING GAS.—William Elmer, New York City.

1st. I claim the construction of a tube attached to the mouth piece of each retort and terminating in a gas-tight rotary supply valve, through which coal or other material for generating inflammable gases is introduced out of contact with the atmosphere into the retorts, and moved forward by means of a receiver and slide situated within the mouth piece, substantially as set forth, and this I claim whether accomplished by a rotary valve or otherwise.

2d. I also claim the construction of an outlet tube from the further or back end of each retort, the end of which tnbe is sealed by dipping into a reservoir of coal tar or other suitable substance, so as to exclnde the air from entering the retorts and to prevent the escape of the gases generated in the retorts, by which the coke is discharged without opening the retorts, substantially as above set forth.

3d. I claim the method of subjecting the gas material within the retorts in a gradual manner to the heat, and as the process advances and the volatile products are given off, the gas material is moved forward until brought in contact with the hightest heat, where it is converted into gases, substantially as above set forth; and this I claim whether the coal or other material employed in gas making is conveyed into the retorts in the precise manner described by me or otherwise.

4th. I further claim the application of a current of electricity introduced into the retorts for the purpose of decomposing the aqueous vapor formed in the process of gas making, and also for the purpose of inducing the chemical affinities of certain elementary bodies present, by which a gaseous compound is formed as above stated.

5th. I further claim the combination of the gas making retort with an electric battery, excited either by heat or by chemical solutions, substantially as above described.

Professor HENRY WURTZ,

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NOTICE

To Gas Companies and Gas Consumers.

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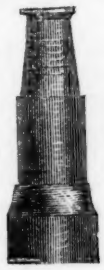

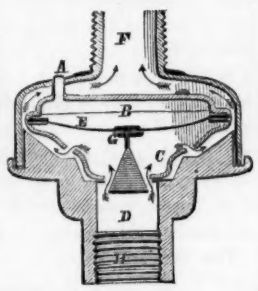

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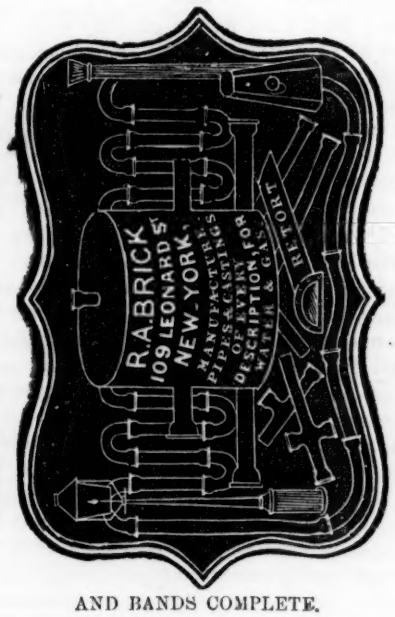

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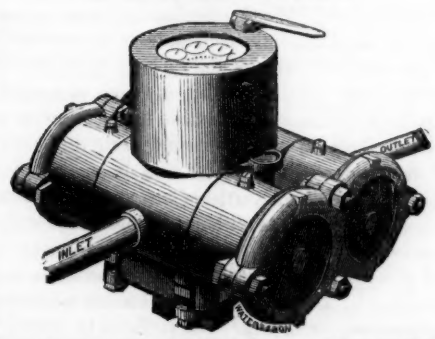

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At No. 22 Pine Street, New York.

BRYANT, CALLENDER & CO.,

EDITORS AND PROPRIETORS.

TUESDAY, JULY 2, 1867.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

SUBSCRIBERS would confer a favor upon us by remitting CHECK or POST OFFICE MONEY ORDERS, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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NOTICE.

☞ Parties having back volumes of this Journal from No. 1 to 7 inclusive, to spare, will please communicate with us, stating the price.

Pneumatic Despatch Line in Paris.

The tube connects the telegraph stations at the Bourse and the Grand Hotel, and is the first installment of a complete system throughout Paris. The method adopted is the reverse of our own, namely, the elasticity of compressed air in place of a partial vacuum, so that neither an air-pump nor a steam engine is required. The power used is water from the reservoirs of the city of Paris, which gives an ascension of rather more than fifty feet. There are three vessels, made of iron plate, and measuring each about 1,200 gallons; the first of these receives the water and effects the compression, the two others are the compressed air. As the water arrives the air within the first vessel is of course forced into the other two, which are connected with it by a valve opening inwards. When the first vessel is filled with water, another cock is opened, the liquid is then allowed to run off and the air to enter by means of a valve provided for the purpose; the operation is then repeated and the effect is the production in the two condensers of a pressure equal to about two atmospheres. The tube that connects the two stations is of cast iron, about 3,500 feet long and 3¼ inches in diameter, having its termini in two chambers with tightly-fitting doors, which allow the piston dispatch-box to be placed or withdrawn from the tube without difficulty. This carrier is a small brass cylinder, four or five inches long, closed at one end, and with a moveable cover at the other. It will contain about forty dispatches in envelopes. Five minutes are found to be sufficient in practice for the piston to make the double journey. The time occupied in the passage of the dispatch box in one direction is sufficient to produce the necessary pressure for the return.—*The Engineer.*

OUR JOURNAL.

Our patrons and readers generally will observe that the ninth volume of this Journal commences with the present issue, and we promise that it shall contain, in its future issues, such articles upon Gas-Light and all matters appertaining thereto, Mining, Water Supply and other Scientific articles, as will make it worthy of a continuance of their support. It cannot be expected that each number will treat alike extensively all of these subjects, but from time to time we shall give them due consideration. To those especially interested in Gas-Light and its incidents, we will say that we shall not neglect that department. A portion will be devoted to gas and steam fitters, plumbers, tinners, etc., giving valuable information, recepes, improvements, etc., in their specialties.

As an advertising medium for all those who manufacture or sell machinery of any kind for Gas, Water, Mining, Sewerage, &c. &c., it offers superior inducements from the fact that it goes directly into the hands of those who are constantly using and requiring machines and their improvements for these branches, and who not only peruse the reading matter but the advertisements as well, for the reason that they are directly interested in all things pertaining thereto. We therefore ask, with confidence, that all parties having machinery or improvements of any kind for either of the subjects to which our Journal is devoted, and in fact, any kind of mechanism, be it patented or otherwise, that has merit, to send us their advertisements and avail themselves of its advantages. It will be seen on another page that our terms for advertising are very reasonable. We will also illustrate with engravings and descriptions, such valuable inventions and improvements as are deemed worthy, upon as liberal terms as any journal of equal standing and circulation, published in this or any other city. Our facilities for drawing and engraving, etc., is superior; but persons desirous to have introduced engravings of their own can be accommodated, provided they are not imperfect.

For the notices of us which some of our brother journalists have made and the kind letters of encouragement and approval we frequently receive we are very thankful.

We would respectfully say to our readers that we consider it a duty for parties whose interests we represent to extend to us their patronage, and to our friends we shall be thankful if they would interest themselves in enlarging our subscription list, and we promise not only to keep our Journal up to its present standard, but our motto shall always be "Excelsior."

THE GAS QUESTION IN CINCINNATI

Twenty years ago, when this great commercial and manufacturing city of to-day was in its infancy, and some time prior to the great development of its trade in the staple which has given it the peculiar and significant cognomen, "Porkopolis," from which, however, it is not to be inferred that pork is its principle article of commerce, or its only source of wealth. It was at this early period, when the most far-seeing could not divine that it would so soon reach its present magnitude, the present Gas Light Company of Cincinnati obtained the franchise to erect works and lay pipes for the manufacture and distribution of gas—a luxury then for the few to enjoy, but a necessity to-day that is imperatively demanded by the many.

This franchise or charter was coupled with the privilege or reservation of the right to purchase the works by the city at the expiration of the 20 years. the proper authorization has been given by a vote of the people to that end, and the city council have, in accordance therewith, passed an ordinance to negotiate bonds to raise the necessary means. It is estimated that about $2,500,000 will be required; but the matter was to be adjusted by the appraisment of a committee, two to be chosen by the city and two by the Gas Company, and these in turn to choose a fifth.

Miles Greenwood, Esq. and Henry Kessler, Esq. were appointed by the city, and Henry Day, Esq., of New York, and O. G. Steele, of Buffalo, were selected by the Gas Company. The selection of the fifth party is a more difficult matter, for it is contended that the lucky man will hold the balance of power, which may save or cost the city many thousands of dollars. The parties appointed as appraisers by the city and also the Gas Company are men selected for their intelligence, integrity and ability, it is fair to be presumed. Yet one of the non-resident stockholders, a Mrs. Dean, of New York, has commenced a suit against the Gas Company and the city to enjoin all the parties and prevent the appraisement and sale, upon the grounds that some or all of the appraisers are not disinterested parties, and thereby incompetent to act in equity.

The four appraisers met on Saturday the 22d of June, at the Burnett House, Cincinnati, persuant to adjournment, for the purpose of selecting the fifth man. No selection was made, however, and an adjournment was had subject to the call of the chairman. It is understood nothing will be done until the motion for an injunction is heard in the U. S. Circuit Court the 8th of next month

Mr. Henry Kessler, one of the city appraisers is President of the Eagle Insurance Co., Mr. Miles Greenwood, the other party, is the founder of the Greenwood Iron Works, one of the prominent establishments of the city. They are both prominent and well known men in business circles, and gentlemen of undoubted honor and integrity.

Messrs. Steele and Day we do not know; but have no doubt they are men who have equal claims to public or private confidence. Mr. Day, we understand, is a broker in New York, and Mr. O. G. Steele is said to be at present, or to have formerly been, a gas engineer of the Buffalo Gas Works.

ERIE BASIN IRON WORKS.

We beg to call the attention of our readers, and gas men in particular, to the advertisements of the Erie Basin Iron Works at South Brooklyn, N. Y. The proprietors of these works are deserving of much praise for the energy and enterprise they have exhibited in establishing works of such magnitude as if by magic almost—only a few months ago it was "void and darkness," or void and water, where now is solid earth upon which has been erected new and substantial buildings with all the multifarious engineery, machinery and appliances for manufacturing steam engines, steam boilers, oil and water tanks, oil stills, mill work and machinery generally, including also gasometers and the various kinds of gas castings and apparatus.

VARIABLE CUT-OFF STEAM ENGINES.

Among other novelties and improvements in machinery, etc., we were particularly interested in the Babcock & Wilcox's Patent Variable Cut-off, which seems to have reached the acme of improvement for economy of fuel, regularity of speed, exceeding simplicity, and non-liability to derangement.

The principle is new and original, and consists in operating the cut-off by a small supplementary steam cylinder which works by the direct action of the steam in the main cylinder. The motion of the valves are therefore instantaneous, and move in *equal* distances always, but in *unequal* times. Hence

the valve seats always wear uniform, and the steam ports being opened, not by degrees but instantaneously, gives the utmost freedom to its action and expansion. By the indicator, and in practice is found to give a variation of only about two per cent., and a saving in fuel of from 20 to 30 per cent., and more.

We shall give an illustration and more minute description of this in our next number.

Messrs. O. Holden and J. E. Simpson, Jr., are the enterprising proprietors of these works, which are located on Elizabeth, Dwight and Van Dyke sts., South Brooklyn, N. Y.

McGEARY'S CARBURATOR.

Mr. James McGeary has invented an apparatus for the purpose of combining the ordinary illuminating gas with the vapor of any of the various hydrocarbons, for the purpose of enriching the same and increasing its illuminating power, so that the combination of the vapors with the gas will, it is asserted, cheapen the cost of ordinary gas for illumination over fifty per cent., without further risk or endangering of life or property by the introduction of his apparatus.

It appears to be a far different affair from that of combining atmospheric air with the vapors of hydrocarbon, which is sometimes liable to form a dangerous and explosive mixture instead of illuminating gas. The gas engendered by his apparatus becomes non-explosive the richer it is charged with hydrocarbons; and in order to make it perfectly safe under all circumstances, the inlet for the hydrocarbons to the carburator, through which the fluid must pass, is effectually protected, and under no circumstances can a flame pass, neither can any explosion take place in the carburator, because fire in any form cannot enter, owing to the above named precaution. The can used for supplying the fluid is also scientifically protected both at the inlet and outlet, so that in case the vapors did come in contact with a flame while the fluid was being transmitted from the can to the apparatus, it would go no further than the point of ignition, for the reason above stated; the flame could not pass into one or the other, but must subside for the want of supply.

The apparatus and its workings can be seen at No. 22 Pine street, room 9, where all information appertaining thereto can be had of the inventor.

LACLEDE FIRE BRICK WORKS, ETC.

We desire to refer our readers, and gas men in particular, to the advertisement of the La Clede Fire Brick Works. These works are situated at Cheltenham, Missouri, near St. Louis, and the proprietors, Messrs. Hambleton & Green, have their office at 1007 North Levee of that city

Mr. S. Hambleton has given particular attention to this business for many years and has spent considerable time in Europe, to obtain information in the art as practiced there, which he has used to great advantage in developing a peculiar branch of industry which bids fair to become one of the most important manufacturing resources of the country. We shall take occasion again to revert to this art, the nature of the clays found in the vicinity of St. Louis, and the uses to which they are adapted wnich want of space now prevents.

Professor Henry Wurtz, Geologist and Scientific Expert, formerly Chemical-examiner in the U. S. Patent Office, and inventor of the Sodium Amalgam which has created such a revolution in working gold and silver ores, etc., has opened a laboratory, at 26 Pine street, rooms 35 and 36, where parties, personally, or by letter, can avail themselves of his valuable services. His advertisement will be seen in another column.

We have some interrsting matter from our "Special Correspondent," and other valuable matter which will have to lay over for the next number.

☞ Gas Companies will please notify us of any change that have taken place in their companies, so as to enable us to publish a correct list.

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BLAST FURNACE LININGS, Bosh Brick and Timp Tile.

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GAS AND BONE RETORTS.

GROUND FIRE CLAY, &c.

Orders left at the office, No. 1007 Levee, between Washington and Carr streets, will receive prompt attention, and goods delivered without delay,

Purchasers can depend upon all articles purchased from us being equal, if not superior, to any other made in the country. (1-1y

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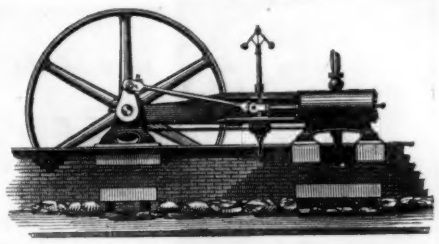

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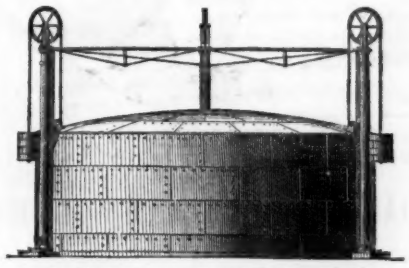

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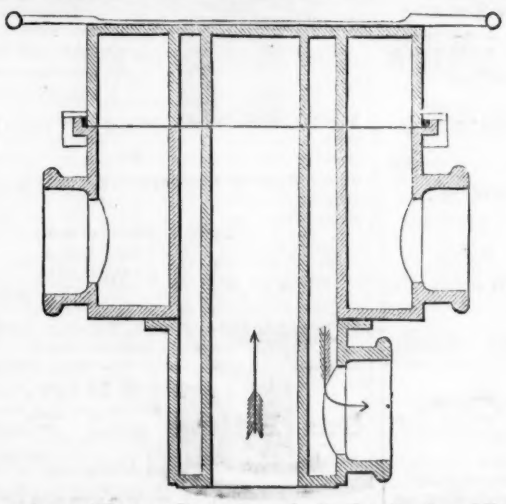

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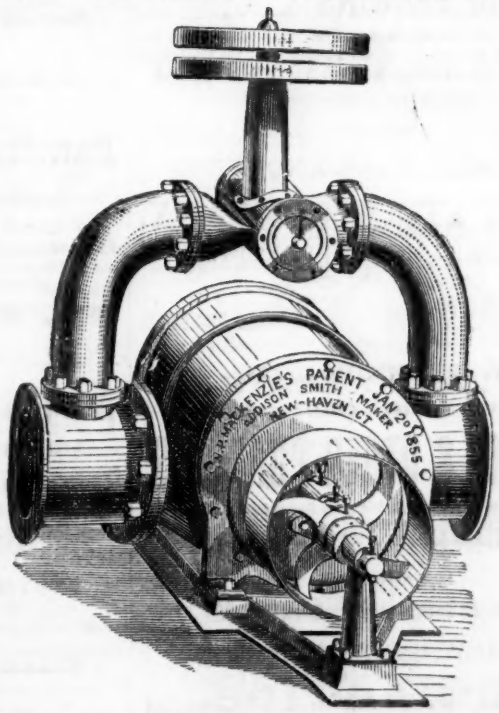

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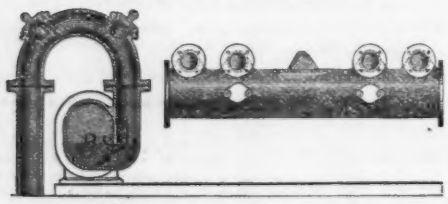

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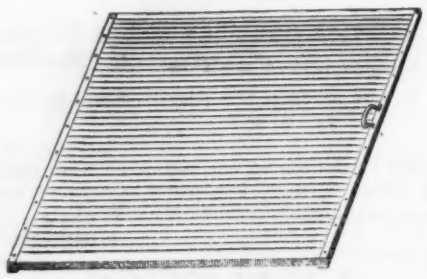

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In all Wire Gauze and Perforated Heaters, it is necessary to keep a nearly wide open cock, and consequently large consumption of Gas. This burner can be turned down so as to use not more than 1-5th of a foot per hour.

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Screw on the Burner as it comes in the package. Light the holes in the dome top. Then, by gradually unscrewing the cylinder from the base, it (the cylinder) is elevated, and the air passages opened, permitting the air to mix with the Gas until the flame becomes quite blue, and combustion perfect.

Burners 2 feet per hour.
" 4 feet per hour.
" 8 feet per hour.

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HOUSES FITTED UP WITH PLUMBING AND GAS WORK IN THE MOST MODERN AND IMPROVED STYLE. SEWERS CONNECTED. BRASS AND LATHE WORK. JOBBING IN ALL ITS BRANCHES ATTENDED TO WITH PUNCTUALITY AND DISPATCH.

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Gas Lights perfected upon New and Unerring Principles.

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Similar results guaranteed under similar circumstances, or NO CHARGE. 65-88

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Manufacturer of all kinds of GAS and WATER PIPE, BRANCHES, CONNECTIONS, T's, ELBOWS, and ALL CASTINGS USED AT GAS AND WATER WORKS.

I offer special inducements to parties wishing to purchase, my Pipe is Smooth, regular in weights, and cast vertically.

N. B.—Pipe from 3-inch and upwards, cast in 12-ft. lengths.

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THE VALUABLE IMPROVEMENT FOR SAVING and otherwise improving the gas, invented by Dr. J. S. Wood, described in the "Gas-light Journal" October 2d, 1866, is now for sale by State or County rights.

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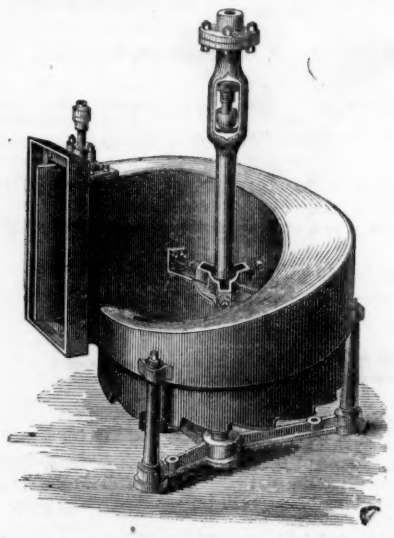
STEVENSON'S

Helical Jonval Turbine Water Wheel,



For first-class mills and factories where great economy of wate and simplicity and durability are required.

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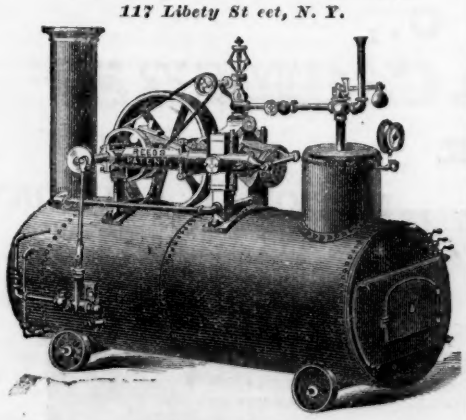

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THESE COOKING STOVES WILL

☞ *Bake, Boil, Stew, Fry and Roast,*

With the greatest economy and facility, and without heating the room in which they are used. They are perfectly simple, operating like an ordinary Kerosene Lamp with a chimney, and are the only Kerosene Stoves that burn without smoke or odor.

"We have been perfectly astonished to see what a labor-saving, dirt saving and heat-saving institution is EDDY'S PATENT KEROSENE STOVE. Taking the cost of running it, and the result attained, it is the best patent in the market."—*Worcester Daily Spy.*

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Manufacturers, No. 605 Sixth Ave., New York.

Send for Illustrated Circular. (136

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☞ *Something New and Invaluable for Family Use.*

We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

It will knit a variety of Stitches—the breakage of needles is trifling—the cost of needles is insignificant and the most delicate material can be knit pure and spotless, as the needles are not oiled.

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HIGHEST PREMIUM

Shuttle Sewing Machine

Has only to be seen and operated to be Appreciated.

Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usually found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

3d. No imperfect action of the feed at uneven places in the work.

4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 200 cotton to coarse linen thread.

5th. The Weed Machine will do beautiful quilting on the bare wadding, without using inner lining; thus leaving it soft as if done by hand.

6th. The variety of fancy work that can be done on the

WEED MACHINE,

with so little trouble, makes it equal, if not superior, to six machines combined; for instance. it Binds, Hems, Tucks and Sews on the band at the same time, and inf acc, the

WEED NO. 2 MACHINE,

as before stated, is equivalent to a combination of any six ordinary machines.

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Below we give a few prices:

No. 2. Oil Black Walnut, Ornamented with Hemmer.	$60,00
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No. 3. Extra Oil-Polished Black Walnut, Half Case, Large Table beautifully Ornamented.	75,00

WEED SEWING MACHINE Co.,

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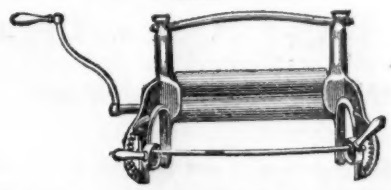
PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog-wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $3 to $10 per day

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and efficient.*

That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.

That wood soaked in water will *swell, shrink,* and *split.*

That wood-bearings for the shaft to run in *will wear out.*

That the Putnam Wringer, with or without cog wheels, will *no tear the clothes.*

That cog-wheel regulators are not essential.

That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.

That all who have tried it pronounce it the *best* Wringer ever made.

That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and any others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydize or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

JOHN W. WHEELER, Cleveland, O.

Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 100 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, $9, and $10.

Sample Wringers sent, express paid, on receipt of price.

Manufactured and sold, wholesale and retail, by

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Gas Heating Apparatus

OF EVERY DESCRIPTION,

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Burners for Wood, Coal Oil and Water Gas.

Gas and Lava Burner Tips

Constantly on Hand

THE AMERICAN METER CO.

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SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
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This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. No. 23 West Street, Boston will meet with prompt attention.

Harris & Brother, Practical Gas Meter Manufacturers,

Continue, as heretofore at their old Establishment, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture

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HARRIS & BRO., No 1117 Cherry st., Philadelphia.

Messrs. Harris & Brother, Philadelphia Gas Works, February 14, 1857.

Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality—the number furnished by you to these works is over 5,000.

JOHN C. CRESSON, Engineer;

Office of the Gas Light Company of Augusta, Ga., March 6th, 1858.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of wokmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.

G. S. HOOKEY, Superintendent of the Gas Light Company of Augusta, Georgia.

Messrs. Harris & Brother, Philadelphia. Philadelphia, March 4, 1858.

Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are, gentlemen, very truly, yours, BIRKINBINE & MEARS.

Messrs. Harris & Brother. March 14, 1857.

Gentlemen—For the last ten years we have used in the Philadelphia Gas Works, meters made in your factory, and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the material used in the manufacture of the same, to be as fine quality as is used in those imported from Europe, or made by any of the manufactur in the United States. Respectfully Yours GEORGE WIEGAND, Inspector of Gas Fittings, Philadelphia

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THE "GROVESTEEN PIANO-FORTE"
RECEIVED THE HIGHEST PREMIUM AT THE
CELEBRATED WORLD'S FAIR.

Where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

By the introduction of improvement we make a still more perfect Piano-Forte, and by manufacturing largely, with a strictly cash system, are enabled to offer these instruments at a price which will preclude all competition.

PRICES

No. 1,	Seven Octave, round corners, Rosewood, Plain Case,		$275
No. 2,	"	" " Heavy Moulding	300
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a fac-simile of the accompanying cut.

TERMS—Net Cash, in current funds Descriptive circular sent free on application.

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Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues, GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

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Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either Telescopic or Single, with Suspension Frames complete; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron, Line Sieves for Purifiers, Hoisting Machines for Lifting Purifier Covers.

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THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

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And other descriptions of
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SAFETY STEAM PUMP,

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And Contractor for Coal or Oil Gas-Works.

Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.

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To Manufacturers of Petroleum Gas.

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

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SAVING OF FUEL TO PARTIES USING STEAM.
DAMPER REGULATORS.

Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 117 Broadway, New York.

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VALVE WATER METER,

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Is now in use by many City Water Cos., because of its low price, simplicity, durability, accuracy under any pressure, and (a great advantage) because it runs with less head than any meter used. Manufactured by H. Q. HAWLEY, Albany, N. Y.

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.

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Great Improvement

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Sewing Machines.

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SHUTTLE MACHINE!

Patented February 14th, 1860.

Salsroom, 536 Broadway.

This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather to the finest Nansook Muslin, with cotton, linen, or silk thread, from the coarsest to the finest numbers.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

Emphatically a Noiseless Machine!

PRICE OF MACHINES,

COMPLETE:

No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
No. 2. Small Manufacturing, with Extension Table, $75
No. 3. Large Manufacturing, with Extension Table, $85
No 3. Large Manufacturing, for Leather, with Rolling Foot and Oil Cup, 100

One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given Terms, invariably CASH on delivery.

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GERMAN LAVA GAS-TIPS

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LAVA TIP GAS BURNERS,

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Mercury Cups, Portable Sockets, Burner Pillars, Burner Pliers, &c., &c.

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For Lighting and Heating Purposes.

GAS HEATING AND COOKING APPARATUS; FITTERS' ROVING APPARATUS, &c.

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Sole Agent for the sale of

Thompson's Gas Controller

in the States of

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In Connection with all the Expresses

No. 30 Broadway,

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Established 1854.

Purchases to order any article wanted from New York, or Europe, for ladies' or gentlemen's use or wear,---comfort or luxury,---from a cameo to a cashmer, a seal ring to a steam engine.

Goods purchased at current City prices, and forwarded by Express or as directed.

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Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

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Express for HAVANA and ISLAND OF CUBA by regular steamships weekly.

Express for MEXICO and VERA CRUZ on the 10th and 16th of every month.

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Packages received for United States Brazil Squadron.

Freights should be sent to our office day before sailing of steamer, with invoice, contents and value.

FINKLE & LYON'S

New Family

SEWING MACHINE

Should be known in

IN EVERY TOWN.

To accomplish this at once and save the expense of a *Travelling Agent*, we offer thus, viz:

Any one sending us orders for two machines shall receive one machine free of charge. This proposition cannot avail after we have appointed a local agent in the town.

We have now completed our *new manufacture* at a cost of some $200,000—introducing *new patents*, and such important improvements, that without fear we are able to offer the following stringent guarantee, viz: After a fair trial, if any purchaser does not prefer the FINKLE & LYON FAMILY SEWING MACHINE to any other, he can return it and have back his money.

This machine has taken many of the HIGHEST PRIZES; *is less complicated than any other first class machine; does a wider range of work without changing; requires no taking apart to clean or oil, no "lessons" to set needle, regulate tension or operate machine.*

Our new Manufacturing Machine is sold on the same terms as the Family Machine.

Please send for a circular with samples of sewing.

Finkle & Lyon S. M. Co.

No. 581 BROADWAY, NEW YORK.

The Lamb Knitting Machine,

Knits Upwards of Twenty Articles of Apparel.

KNITS HOSIERY OF ALL SIZES.

KNITS THE HEEL AND NARROWS OFF THE TOE, COMPLETE.

PAIR OF SOCKS COMPLETE IN 30 *MINUTES.*

The Lamb Knitting Machine.

Next to the sewing machine, there is probably no invention for labor-saving of equal value to the knitting machine. In Hood's Song of the Shirt, he describes, most affectingly, the poor seamstress at her midnight toil over the garment.

"It is stitch, stitch, stitch,
With the fingers weary and worn,"

until the soul becomes exhausted in the endeavor to earn the miserable pittance to buy food to keep the vital spark alive. The same song might have been employed to describe the pains of the industrious being, who, by necessity, is driven to the use of the knitting needle. Even when used as of yore by our grandmothers as a source of comparative recreation, the constant muscular action, although almost involuntary by long habit, would finally produce a nervous exhaustion very injurious to many constitutions. And it is not strange, when we take into consideration the miles that the hands and fingers have to travel to knit a single pair of socks.

The Lamb Knitting machine described and illustrated herewith, has taken a stride far in advance of anything of the kind, as it is constructed upon an entirely new principle, which is so simple as to revolutionize the art of knitting, and nervous affections arising from hand knitting need no longer be known.

This machine, unlike others, is capable of performing all the operations heretofore done only by hand. It will widen and narrow, and form the heel and "gore." It will knit tubular or flat, double or ribbed, in various styles and colors, and produce fabrics of every variety of staple and fancy knitting, all of which are shaped by the machine and with a rapidity wonderful to behold. Its ordinary speed is from four to five thousand loops a minute, producing a yard of plain knitting in ten minutes. Shawls, capes, hoods, jackets, nubias, sacks, afghans, sashes, cravats, tidies, and numberless other articles can be fabricated by this machine.

The engraving gives an excellent idea of the appearance of the machine ready for action, with the weight attached to the web. It operates with two straight rows of needles, running parallel and near to each other as shown, by the action of the crank. Each row will operate separately, producing a flat web, or both rows will operate at the same time from right to left or left to right, producing a tubular fabric, and the changes can be made without stopping or re-adjusting.

The needles are operated by cams, which, as every machinist knows, are unsurpassed for simplicity and durability.

The cam acts upon a greater or less number of the needles, as required, so any number of loops can be added to or taken from the web, and its size can be regulated at will.

This wonderful machine was patented by Mr. J. W. Lamb, and has been greatly improved by the Lamb Knitting Machine Manufacturing Company, of Rochester, N. Y., incorporated June 17th, 1865. It has received several gold medals at the State Fairs of New York, Massachusetts and elsewhere.

Messrs. Hulbert & Bros. are general agents No. 173 West 4th street, Cincinnati, Ohio. Branch office No. 99 Washington street, Chicago An agency will soon be established in this city.

Miscellaneous Items.

—The alloys of steel with platinum, when both are in a state of fusion, are very perfect in every proportion that has been tried. Equal parts by weight form a beautiful alloy, which takes a fine polish and does not tarnish; the color is the finest imaginable for a mirror. The specific gravity of this beautiful compound is 9.862.

—It is expected that one mile of the railroad up Mount Washington will be completed about the middle of July, and that then cars will run that distance to a place called "Waumbeck Junction," two miles from the top. The average grade of the road is 1,300 feet to the mile.

—Messrs. Cammell & Co., of Sheffield, England, are now making armor plates the inner two-thirds of which are of iron and the outer one-third of steel united with the iron by welding in the rolls. Experiments upon these plates with the Palisser chilled shot do not prove very satisfactory; but Messrs. Campbell say that while showing the defects they have also shown how to remedy them. The welds remained perfect after the experiments.

—Mr. Mallet found from experiments made at Holyhead, by means of blasting, that the larger the charge of gunpowder, and therefore the louder the report, the more rapid was the transmission of the sound. With a charge of 2,000 pounds of gunpowder the velocity was 967 feet in a second, while with a charge of 12,000 lbs. it was 1,210 feet in the same time.

—A simple machine, patented by a Mr. Cabanes, consists in principle of a rotary fan drawing a powerful current of air through a case packed with sponges which may be saturated with any purifying, ozonizing or freezing mixture, and thus a cool, fresh, or if you please, perfumed breeze may be enjoyed in any situation and at any season.

—An Australian paper announces the recent discovery of a new liquid gum, or oil, in that country. A tract of land not less than ten miles square had been discovered, which everywhere abounded with bubbling springs of this gum, or oil, while all around were vast quantities of the gum solidified into the consistency of India rubber. This, when exposed to a fire, burns with a bright flame, accompanied by a thick smoke and a smell like old grease. The substance is light and floats in water.

—The new water works at Norwich, Conn., will drain an area of five hundred acres, and the reservoir will cover seventy acres and contain 40,000,000 cubic feet of water, enough to supply forty gallons a day to each of the city's 20,000 inhabitants.

—A steam engine has been put in operation at the Buffalo water works. The steam cylinder is sixty-five inches in diameter, with ten feet stroke, and the pump is three feet by ten, raising at every stroke over eight hundred gallons, or about thirteen hogsheads of water, and making four strokes per minute.

FEB 10 1867.